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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/063,822

05/16/2002

Shu-Wen Sung

KYCP0005USA

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10/21/2004

NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE)

P.O. BOX 506

MERRIFIELD, VA 22116

EXAMINER

NGUYEN, JOSEPH H

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 10/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/063,822

Applicant(s)

SUNG ET AL.

Examiner

Joseph Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-7 and 10-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-7 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 10-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 May 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 14 are rejected under 35 U.S.C. 102(b) as being anticipate by Ming-Jiunn et al (US 6078064).

Regarding claim 1, Ming-Jiunn et al discloses on figure 2 a light emitting diode comprising an insulating substrate 18; a semiconductor stack positioned over the insulating substrate, the semiconductor stack comprising a first surface and a second surface, a distance between the first surface and the insulating substrate 18 is greater than a distance between the second surface and the insulating substrate; a reverse tunneling layer 12A over the first surface; a first transparent ohmic contact electrode 11B positioned directly on the reverse tunneling layer; and a second transparent ohmic contact electrode 19 positioned over the second surface.

Regarding claim 3, Ming-Jiunn et al discloses on figure 2 the first transparent ohmic contact electrode 11B comprises at least one selected from a group comprising ITO (col. 2, lines 38-39).

Regarding claim 14, Ming-Jiunn et al discloses on figure 2 an insulating substrate 18; a semiconductor stack positioned over the insulating substrate, the semiconductor

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stack comprising a first surface and a second surface, a distance between the first surface and the insulating substrate is greater than a distance between the second surface and the insulating substrate; a reverse tunneling layer 12A over the first surface; and a first transparent ohmic contact electrode 11B directly on the reverse tunneling layer.

Claims 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Saito et al.

Regarding claim 10, Saito et al discloses on figure 12 a light emitting diode comprising an insulating substrate 400; a semiconductor light emitting stack positioned over the insulating substrate, the semiconductor light emitting stack comprising a first surface and a second surface, a distance between the first surface and the insulating substrate is greater than a distance between the second surface and the insulating substrate; a first non-metal transparent ohmic contact electrode 412 positioned over the first surface; and a second non-metal transparent ohmic contact electrode 412 over the second surface, wherein the first non-metal transparent ohmic contact and the second non-metal transparent ohmic contact electrode 412 comprise the same material.

Regarding claim 11, Saito et al discloses on figure 12 the first non-metal transparent ohmic contact electrode 412 and the second non-metal transparent ohmic contact electrode comprise at least one selected from a group comprising ITO (col. 12, lines 38-39).

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ming-Jiunn et al as applied to claim 1 above, and further in view of Saito et al.

Regarding claim 2, Ming-Jiunn et al discloses on figure 2 substantially all the structure set forth in the claimed invention except the first transparent ohmic contact electrode and the second transparent ohmic contact electrode comprising the same non-metal material. However, Saito et al discloses on figure 12 the first transparent ohmic contact electrode 412 and the second transparent ohmic contact electrode 412 comprising the same non-metal material (col. 12, lines 38-39). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ming-Jiunn et al by having the first transparent ohmic contact electrode and the second transparent ohmic contact electrode comprising the same non-metal material for the purpose of providing a high emission efficiency in a semiconductor light emitting diode.

Claim 12 is rejected under 35 U.S.C. 102(b) as anticipated by Ming-Jiunn et al or, in the alternative, under 35 U.S.C. 103(a).

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Regarding claim 12, Ming-Jiunn et al discloses on figure 2 a light emitting diode comprising an insulating substrate 18; a semiconductor stack positioned over the insulating substrate, the semiconductor stack comprising a first surface and a second surface, a distance between the first surface and the insulating substrate is greater than a distance between the second surface and the insulating substrate; a reverse tunneling layer, which has a carrier concentration of approximately  $1.5 \times 10^{20} \text{ cm}^{-3}$  over the first surface (col. 2, lines 40-49); a first transparent ohmic contact electrode 11B directly on the reverse tunneling layer; and a second transparent ohmic contact electrode 19 over the second surface.

In the alternative, if Ming-Jiunn et al does not teach the reverse tunneling layer having a carrier concentration of approximately  $1.5 \times 10^{20} \text{ cm}^{-3}$ . Note that Ming-Jiunn et al teaches that the reverse tunneling layer 12A having a carrier concentration of greater than  $5 \times 10^{18} \text{ cm}^{-3}$  (col. 2, lines 48-49). However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Ming-Jiunn et al by having the reverse tunneling layer having a carrier concentration of approximately  $1.5 \times 10^{20} \text{ cm}^{-3}$  for the purpose of providing good contact through tunneling effect as taught by Ming-Jiunn et al (col. 2, lines 44-46), since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ming-Jiunn et al as applied to claim 12 above.

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Regarding claim 13, Ming-Jiunn et al discloses on figure 2 substantially all the structure set forth in the claimed invention except the reverse tunneling layer having a thickness of approximately 20 Å. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Ming-Jiunn et al by having the reverse tunneling layer having a thickness of approximately 20 Å for the purpose of providing good contact through tunneling effect as taught by Ming-Jiunn et al (col. 2, lines 44-46), since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Allowable Subject Matter***

Claims 5-7 are allowed.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-3, 10-14 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's

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supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications.

JN  
October 18, 2004



JEROME JACKSON  
PRIMARY EXAMINER